

forming a plurality of switching elements, a plurality of picture element electrodes connected to the plurality of the switching elements and a plurality of color filters which are arranged so as to correspond to the plurality of the picture element electrodes on an area of the first substrate corresponding to a display region of the liquid crystal display device, and a light shielding frame layer on the first substrate around a periphery of the display region; and

forming a plurality of counter electrodes on an area of the second substrate.

REMARKS

The Applicants appreciate the Examiner's thorough examination of the subject application and request reconsideration of the subject application based on the foregoing amendments and the following remarks.

Claims 1 through 17 are pending in the subject application. Claims 1 through 17 stand rejected under 35 U.S.C. 103.

Claims 1 and 10 were amended to address the Examiner's rejections and to more distinctly claim applicant's invention. The amendments to the claims are supported by the originally filed disclosure.

The drawing figures were objected to and correction required. An amendment is

filed herewith to address the drawing objections. The amendment to the specification does not introduce new matter because they either are editorial in nature or are supported by the originally filed disclosure.

35 U.S.C. 103 REJECTIONS

Claims 1 through 17 stand rejected under 35 U.S.C. 103 as being unpatentable over Kadota et al. (USP 5,818,550; "reference"). The Applicants respectfully traverse as discussed below. Because claims 1 and 10 were amended in the instant amendment, the following discussion refers to the language of the amended claims. However, only those amended features specifically relied upon to distinguish the claimed invention from the cited prior art shall be considered as being made to overcome the cited reference.

The Applicants respectfully contend that the Examiner has failed to establish a *prima facie* case of obviousness, and therefore the rejections under § 103 are improper and should be withdrawn.

The claimed invention relates to a liquid crystal display device which may be incorporated in audio visual apparatuses, office automation apparatuses, or the like; and, a method for producing the liquid crystal display device (see page 1, lines 4 through 8, of the application). The claimed invention solves several problems; *e.g.*, the problem of reducing the complexity of adhering a thin-film transistor (TFT) substrate

and a counter substrate to each other. A liquid crystal display device generally includes such a TFT substrate and a counter substrate with a liquid crystal layer disposed therebetween.

To this end, the claimed invention includes a liquid crystal display device with a first substrate; a second substrate; and, a liquid crystal layer interposed between the first substrate and the second substrate, wherein the first substrate includes a plurality of switching elements, a plurality of picture element electrodes connected to the plurality of the switching elements and a plurality of color filters which are arranged so as to correspond to the plurality of the picture element electrodes on an area of the first substrate corresponding to a display region of the liquid crystal display device, and a light shielding frame layer around a periphery of the display region, and wherein there is *no gap* between each picture element electrode at the periphery of the display region and the light shielding frame layer, as recited in amended claim 1 (see FIGS. 2 and 4, including picture elements **106** and a light shielding frame member **110**, of the application).

The invention disclosed in the Kadota reference relates to a color display device of active matrix type having a color filter provided on a substrate which carries switching elements formed thereon to drive pixel electrodes (see column 1, lines 5 through 10, of Kadota et al.). The invention of the Kadota reference focuses on solving the problem of reducing the risk of damaging the color filter by sputtering, which is

executed for the purpose of forming transparent pixel electrodes of the color display device. Such a sputtering process can cause the surface of the color filter to be roughened (see column 1, line 62, to column 2, line 1, of Kadota et al.).

To this end, the invention of the Kadota reference includes a color display device with a second layer including color filters, a fourth layer including pixel electrodes aligned with the color filters, and a third layer including a planarization film interposed between the second layer and the fourth layer. The color filters are therefore protected from becoming roughened during the sputtering process by the planarization film (see column 2, line 57, to column 3, line 1, of Kadota et al.).

The claimed invention and the invention of the Kadota reference therefore solve different problems. Specifically, the claimed invention can be used for solving the problem of reducing the complexity of *adhering a TFT substrate to a counter substrate in the manufacture of a liquid crystal display device*. In contrast, the invention of the Kadota reference focuses on solving the problem of *reducing damage to color filters of a color display device during a sputtering process*.

Because the claimed invention and the invention of the Kadota reference address different problems, there is no motivation in Kadota et al. to modify the reference for the purpose of reducing the complexity of adhering a TFT substrate and a counter substrate to each other. Because there is no motivation in the Kadota reference to make such a

modification, a *prima facie* case of obviousness has not been established and the rejections under § 103 are improper.

It is well settled that the mere fact that the prior art *may* be modified in the manner suggested by the Examiner does not make the modification obvious *unless the prior art suggested the desirability of the modification.*

Even if the Kadota reference suggested the desirability of the modification, the resulting modification would not meet amended claim 1. Specifically, the Examiner admits on page 2 of the Office action that the Kadota reference does not disclose a light shielding frame layer around a periphery of the display region. The Examiner further states on the same page that having a light shielding frame layer around a periphery of the display region is conventional, and therefore it would have been obvious to include such a light shielding frame layer in a liquid crystal display device.

However, the Applicants explained in the DESCRIPTION OF THE RELATED ART portion of the application that conventional light shielding frame layers formed on either the counter substrate or the TFT substrate have shortcomings. Specifically, the size of a conventional light shielding frame layer formed on a counter substrate is limited in order that UV curable sealing resin, used for adhering the TFT and counter substrates to each other, can be irradiated by UV light. This small size of the light shielding frame layer necessitates higher alignment accuracy in assembling the light shielding frame

section with the module, which renders the step of adhering the TFT and counter substrates complicated (see page 4, lines 1 through 16, of the application).

Further, forming a conventional light shielding frame layer on a TFT substrate generally requires that color filters for displaying colors or light shielding layers (*i.e.*, a black matrix) be formed on a counter substrate. In this case, the sealing margin of the TFT and counter substrates is very small, thereby rendering the step of adhering the TFT and counter substrates complicated (see page 4, line 18, to page 5, line 6, of the application).

The Applicants have overcome these shortcomings by providing a liquid crystal display device with a first substrate; a second substrate; and, a liquid crystal layer interposed between the first substrate and the second substrate, *wherein the first substrate includes* a plurality of switching elements, *a plurality of picture element electrodes* connected to the plurality of the switching elements and *a plurality of color filters* which are arranged so as to correspond to the plurality of the picture element electrodes on an area of the first substrate corresponding to a display region of the liquid crystal display device, *and a light shielding frame layer* around a periphery of the display region, and *wherein there is no gap between each picture element electrode at the periphery of the display region and the light shielding frame layer*, as recited in amended claim 1.

Clearly, even if the Kadota reference suggested the desirability of the modification, as required in a *prima facie* case of obviousness pursuant to § 103, the resulting modification would not meet amended claim 1.

The Applicants have also overcome the above-mentioned shortcomings by providing a method for producing a liquid crystal display device including a first substrate, a second substrate and a liquid crystal layer interposed between the first substrate and the second substrate, the method including the steps of forming a plurality of switching elements, a plurality of picture element electrodes connected to the plurality of the switching elements and a plurality of color filters which are arranged so as to correspond to the plurality of the picture element electrodes on an area of the first substrate corresponding to a display region of the liquid crystal display device, and a light shielding frame layer on the first substrate around a periphery of the display region; and, forming a plurality of counter electrodes on an area of the second substrate, as recited in amended claim 10.

Accordingly, amended claim 10 requires that the switching elements, the color filters, and the light shielding frame layer be formed on the *same* substrate. As admitted by the Examiner, the Kadota reference does *not* disclose a mere conventional light shielding frame layer, much less the light shielding frame layer of amended claim 10. Further, the Kadota reference does not teach the problem solved by amended claim 10 or its source. Clearly, even if the Kadota reference suggested the desirability of the

modification, the resulting modification would not meet amended claim 10.

The Applicants have also overcome the shortcomings of the prior art by providing a liquid crystal display device including a first substrate; a second substrate; and, a liquid crystal layer interposed between the first substrate and the second substrate, wherein the first substrate includes a plurality of switching elements, a plurality of picture element electrodes connected to the plurality of the switching elements and light shielding layers on the switching elements on an area of the first substrate corresponding to a display region of the liquid crystal device, a driving circuit for driving the switching elements, and a light shielding frame layer around a periphery of the display region formed over the driving circuit, as recited in base claim 8.

Accordingly, base claim 8 requires that the plurality of switching elements, the driving circuit for driving the switching elements, and the light shielding frame layer formed over the driving circuit be on the *same* first substrate. As admitted by the Examiner, the Kadota reference does *not* disclose a mere conventional light shielding frame layer, much less the light shielding frame layer of base claim 8.

Specifically, because the light shielding frame layer of base claim 8 is formed over the driving circuit, the light shielding frame layer shades the driving circuit, thereby preventing malfunctions of the liquid crystal display device. Accordingly, the Kadota reference does not teach the problem solved by base claim 8 or its source. Clearly, even

if the Kadota reference suggested the desirability of the modification, the resulting modification would not meet base claim 8.

The Applicants have also overcome the shortcomings of the prior art by providing a method for producing a liquid crystal display device including a first substrate, a second substrate, and a liquid crystal layer interposed between the first substrate and the second substrate, the method including the steps of forming a plurality of switching elements, a plurality of picture element electrodes connected to the plurality of switching elements, light shielding layers on the switching elements on an area of the first substrate corresponding to a display region of the liquid crystal display device, a driving circuit for driving the switching elements, and a light shielding frame layer on the first substrate around a periphery of the display region formed over the driving circuit, as recited in base claim 16.

Accordingly, like base claim 8, base claim 16 requires that the plurality of switching elements, the driving circuit for driving the switching elements, and the light shielding frame layer formed over the driving circuit be formed on the *same* first substrate. Further, because the light shielding frame layer of base claim 16 is formed over the driving circuit, the light shielding frame layer shades the driving circuit, thereby preventing malfunctions of the liquid crystal display device.

As admitted by the Examiner, the Kadota reference does *not* disclose a mere

conventional light shielding frame layer, much less the light shielding frame layer of base claim 16. Further, the Kadota reference does not teach the problem solved by base claim 16 or its source. Clearly, even if the Kadota reference suggested the desirability of the modification, the resulting modification would not meet base claim 16.

It is respectfully submitted that for the foregoing reasons, base claims 1, 8, 10, and 16 are patentable over the cited reference and satisfy the requirements of 35 U.S.C. 103. As such, base claims 1, 8, 10, and 16, including the claims dependent therefrom are allowable.

DRAWING OBJECTIONS

The Examiner objected to the drawing because FIGS. 6 and 7 thereof did not include a prior art legend and requested correction. An amendment to the drawing is being submitted herewith to add the prior art legends as requested by the Examiner. As such the drawing, as amended, is considered acceptable.

It is respectfully submitted that the subject application is in a condition for allowance. Early and favorable action is requested.

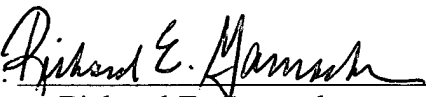
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RESPONSE TO OFFICE ACTION
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The Applicants believe that additional fees are not required for consideration of the within Response. However, if for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. **04-1105**.

Respectfully submitted,

DIKE, BRONSTEIN, ROBERTS
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